

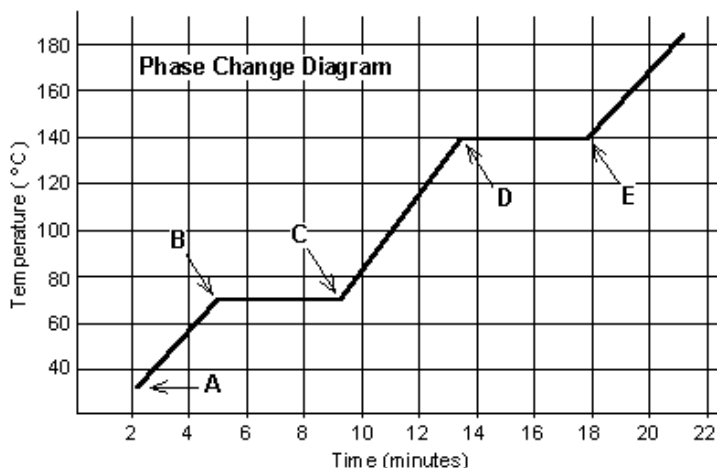
The Nature of Matter WS 5

The graph was drawn from data collected as a substance was heated at a constant rate. Use the graph to fill in the blanks.

At **point A**, the beginning of observations, the substance exists in a solid state. Material in this phase has _____ volume and _____ shape. With each passing minute _____ is added to the substance. This causes the molecules _____ more rapidly which we detect by a _____ rise in the substance, this results in a change in

_____ energy. At **point B**, the temperature of the substance is _____ °C. The solid begins to _____. At **point C**, the substance is completely _____ or in a _____ state. Material in this phase has _____ volume and _____ shape. The energy put to the substance between minutes 5 and 9 was used to convert the substance from _____ to _____. This heat energy is called the **heat of fusion** and is causing a change in _____ energy.

Between 9 and 13 minutes, the added energy increases the _____ of the substance. During the time from **point D to point E**, the liquid is _____. By **point E**, the substance is completely in the _____ phase. Material in this phase has an _____ volume and _____ shape. The energy put to the substance between minutes 13 and 18 converted the substance from a _____ to a _____ state. This heat energy is called the **heat of vaporization**. Beyond **point E**, the substance is still in the _____ phase, but the molecules are moving _____ as indicated by the increasing temperature.



Which of these three substances was likely to be used in this phase change experiment ???

Substance	Melting Point	Boiling Point
Bolognium	20°C	100°C

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Unobtainium	40°C	140°C
Foosium	70°C	140°C

Phase Changes:

Answer the following:

1. Changing from a liquid to a solid is called: _____

2. Changing from a liquid to a gas is called: _____

3. Changing from a gas to a liquid is called: _____

4. Changing from a solid to a gas is called: _____

5. Changing from a solid to a liquid is called: _____

6. Changing from a gas to a solid is called: _____

7. Which three phase changes require the addition of heat?

1. _____ 2. _____ 3. _____

8. Which three phase changes require the removal of heat?

1. _____ 2. _____ 3. _____

9. The temperature at which a liquid changes to a solid is called the _____. For water, this temperature is _____ degrees Celsius and _____ degrees Fahrenheit.

10. The temperature at which a liquid changes to a gas is called the _____. For water, this temperature is _____ degrees Celsius and _____ degrees Fahrenheit.

11. All phase changes are examples of _____ changes. (chemical or physical)

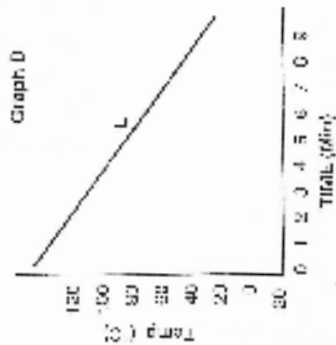
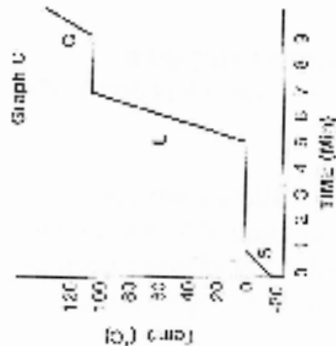
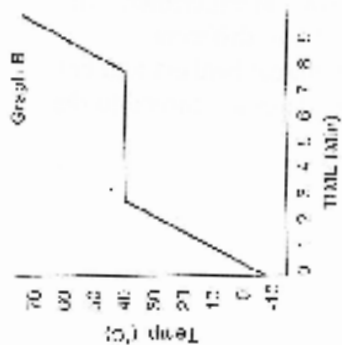
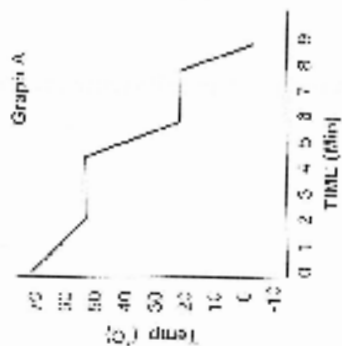
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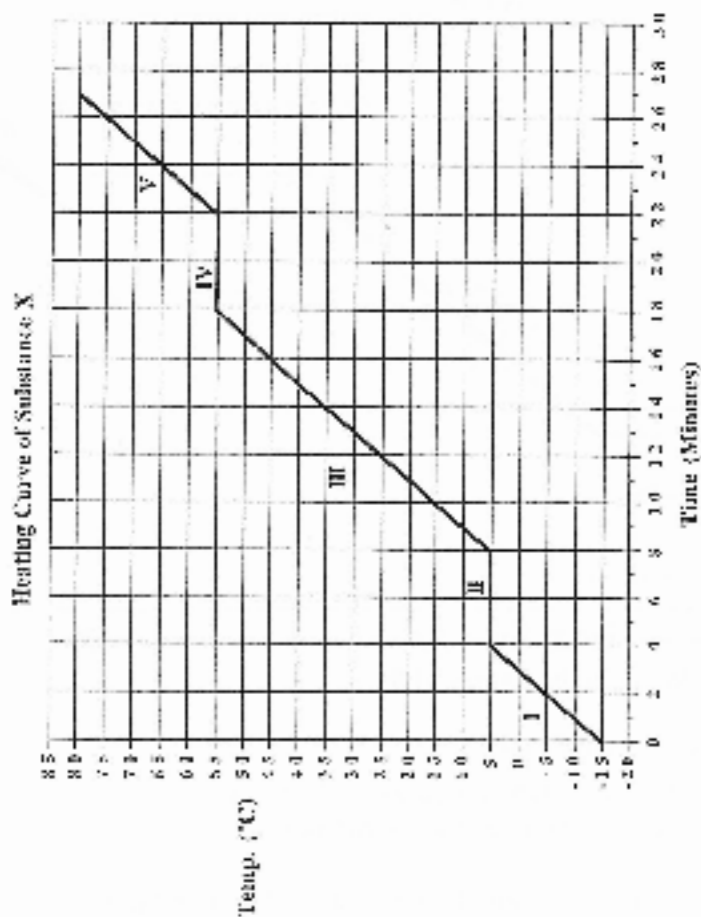
HEATING AND COOLING CURVE REVIEW



- 1) In graph A, what phases are present at 20 °C?
- 2) How many phase changes take place in graph B?
In graph C? What phase changes take place in graph D?
- 3) In graph B, during what time interval is the substance entirely a solid?
A liquid?
- 4) What graph could represent pure water?
- 5) Are any of the substances the same? How do you know?
- 6) At what time in graph B has the substance just finished melting?

CHEMISTRY

HEATING CURVE WORKSHEET



The heating curve shown above is a plot of temperature vs time. It represents the heating of substance X at a constant rate of heat transfer. Answer the following questions using this heating curve:

- _____ 1. In what part of the curve would substance X have a definite shape and definite volume?
- _____ 2. In what part of the curve would substance X have a definite volume but no definite shape?
- _____ 3. In what part of the curve would substance X have no definite shape or volume?
- _____ 4. What part of the curve represents a mixed solid/liquid phase of substance X?
- _____ 5. What part of the curve represents a mixed liquid/vapor phase of substance X?
- _____ 6. What is the melting temperature of substance X?
- _____ 7. What is the boiling temperature of substance X?